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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/924,333	08/07/2001	Paul D. Shirley	500176.03	3555

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EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 10/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/924,333

Applicant(s)

SHIRLEY, PAUL D.

Examiner

Rudy Zervigon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-10,13-32 and 34-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-10,13-32 and 34-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Double Patenting

1. The terminal disclaimer filed on August 4, 2003 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of USPat. 6,322,626 B1 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1, 2, 4-10, 13, 14, 17-23, 26, 27, 29-32, 34, 35, and 37-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hagge et al (U.S.Pat. 3,710,251) in view of Suzuki et al (U.S.Pat. 5,474,877).

Hagge et al describes an apparatus for controlling a temperature of a microelectronic substrate (item 11, Figure 1,2; column 4, lines 20 -51), the substrate having a first surface and a second surface opposite the first surface, the apparatus comprising:

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a substrate support (item 10, Figure 1,2; column 4, lines 20 -51) having at least one support surface (14) for engaging and supporting the substrate (item 11, Figure 1,2; column 4, lines 20 -51); and a temperature controller (item 56, Figure 2; column 6, lines 16 -31) positioned at least proximate to the substrate support, the temperature controller having a first thermal link (item 27, Figure 2; column 4, lines 19-52) coupled with a first portion (side of 11 closest to 27) of the substrate and a second thermal link (item 26, Figure 2; column 4, lines 19-52) coupled with a second portion (side of 11 closest to 26) of the substrate (item 11, Figure 1,2; column 4, lines 20 -51), the first and second thermal links being separately controllable (59, 60, 63, and 64; column 6, lines 32-60) for transferring heat to or from the first and second portions at different rates (column 2, lines 59-65; column 6 and 7).

the temperature controller (item 56, Figure 2; column 6, lines 16 -31) is fixed (figure 2) relative to the substrate (item 11, Figure 1,2; column 4, lines 20 -51) when the substrate (item 11, Figure 1,2; column 4, lines 20 -51) is supported by the substrate support (item 10, Figure 1,2; column 4, lines 20 -51)

the first thermal link (item 27, Figure 2; column 4, lines 19-52) includes a first nozzle (22, Figure 1) having a first orifice (23, Figure 1,2) directed toward the first portion (side of 11 closest to 27) of the substrate (item 11, Figure 1,2; column 4, lines 20 -51) and the second thermal link (item 26, Figure 2; column 4, lines 19-52) includes a second nozzle (20, Figure 1,2) having a second orifice (21, Figure 1,2, Figure 1,2) directed toward the second portion (side of 11 closest to 26) of the substrate (item 11, Figure 1,2; column 4, lines 20 -51).

a manifold (items 26,27, Figure 1,2,2) coupled to the first and second nozzles

a source of liquid (items 87, 70; Figure 2) coupled to the first and second nozzles

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the first thermal link (item 27, Figure 2; column 4, lines 19-52) is coupled (thermally) directly with the first portion (side of 11 closest to 27) of the substrate (item 11, Figure 1,2; column 4, lines 20 -51) and the second thermal link (item 26, Figure 2; column 4, lines 19-52) is coupled directly with the second portion (side of 11 closest to 26) of the substrate (item 11, Figure 1,2; column 4, lines 20 -51)

the first thermal link (item 27, Figure 2; column 4, lines 19-52) includes a first electrical element ("thermocouple", column 8, lines 15-23) spaced apart from the first portion (side of 11 closest to 27) of the substrate (item 11, Figure 1,2; column 4, lines 20 -51) and the second thermal link (item 26, Figure 2; column 4, lines 19-52) includes a second electrical element ("thermocouple", column 8, lines 15-23) spaced apart from the second portion (side of 11 closest to 26) of the substrate (item 11, Figure 1,2; column 4, lines 20 -51)

The apparatus of claim 1 wherein the first and second thermal links are annular (see curvature of 20, 22 of Figure 1) relative to an axis extending generally perpendicular to at least one of the first and second surfaces of the substrate (item 11, Figure 1,2; column 4, lines 20 -51)

The apparatus of claim 1 wherein the first and second thermal links are concentric (see curvature of 20, 22 of Figure 1) relative to an axis extending generally perpendicular to at least one of the first and second surfaces of the substrate (item 11, Figure 1,2; column 4, lines 20 -51)

The apparatus of claim 1 wherein the first thermal link (item 27, Figure 2; column 4, lines 19-52) includes a heat source – when valve 64 is closed and valve 63 is open

The apparatus of claim 1 wherein the first thermal link (item 27, Figure 2; column 4, lines

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19-52) includes a cooling source – when valve 64 is open and valve 63 is closed the substrate support having an engaging surface (14) positioned to support the substrate, the substrate support having an open portion (43) adjacent the second surface (top surface) of the substrate to allow direct thermal contact with the second surface (top surface), a temperature controller (item 56, Figure 2; column 6, lines 16 -31) coupled to a source of gas (51, Figure 1; “nitrogen vapor flow”; column 6, lines 16-31), the temperature controller having at least one orifice (48) proximate to the substrate support (10) for directing a flow of the gas directly against the second surface (top surface) of the substrate

Hagge et al does not teach a substrate support that is rotatable about a rotation axis. Hagge et al also does not describe a liquid supply conduit having an opening for dispensing a liquid onto the substrate.

Suzuki et al describes a substrate (11) support (12) that is rotatable about a rotation axis (Figure 1,2; column 3, lines 1-5) that extends through the substrate and perpendicular to the first and second surfaces of the substrate. Suzuki et al describes a liquid supply conduit (30) having an opening for dispensing a liquid onto the substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Hagge to replace his substrate support with Suzuki’s substrate support that is rotatable about a rotation axis (Figure 1,2; column 3, lines 1-5) and provide a liquid supply conduit having an opening for dispensing a liquid onto the substrate.

Motivation for Hagge to replace his substrate support with Suzuki’s substrate support that is rotatable about a rotation axis and to provide a liquid supply conduit having an opening for

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dispensing a liquid onto the substrate is to develop a resist pattern that is evenly dispersed when coated.

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hagge et al (U.S.Pat. 3,710,251) and Suzuki et al (U.S.Pat. 5,474,877) in view of Getchel et al (U.S.Pat. 6,073,681). Hagge and Suzuki are discussed above. Hagge and Suzuki do not teach at least one offset having an engaging surface for engaging the substrate.

Getchel et al describes a work piece chuck for mounting a semiconductor wafer. Specifically, Getchel et al describes a substrate (item 451, Figure 8, column 12, lines 1-7) support (item 427, Figure 8, column 11, line 67) includes at least one offset (item 445abc, Figure 8, column 12, lines 1-7) having an engaging surface for engaging the substrate (item 11, Figure 1,2; column 4, lines 20 -51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Getchel's offsets to Hagge and Suzuki's workpiece support.

Motivation for adding Getchel's offsets to Hagge and Suzuki's workpiece support is to further secure the work piece substrate as taught by Getchel.

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hagge et al (U.S.Pat. 3,710,251) and Suzuki et al (U.S.Pat. 5,474,877) in view of Herbert E. Mayer (U.S.Pat. 4,432,635). Hagge and Suzuki are discussed above. Hagge and Suzuki do not teach a first electrical element including a first thermoelectric device and a second electrical element including a second thermoelectric device where the thermoelectric devices configured to generate a heating effect when current is passed through a devices in a first direction and a cooling effect when current is passed through the devices in an opposite direction.

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Herbert E. Mayer describes a first electrical element (21) including a first thermoelectric device and a second electrical element (22) including a second thermoelectric device where the thermoelectric devices (Peltier cells) configured to generate a heating effect when current is passed through a devices in a first direction and a cooling effect when current is passed through the devices in an opposite direction (column 3, lines 25-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Hagge and Suzuki to use Mayer's Peltier cells of a first electrical element (21) including a first thermoelectric device and a second electrical element (22) including a second thermoelectric device where the thermoelectric devices configured to generate a heating effect when current is passed through a devices in a first direction and a cooling effect when current is passed through the devices in an opposite direction (column 3, lines 25-35).

Motivation for Hagge and Suzuki to use Mayer's Peltier cells is discussed by Herbert E. Mayer (column 3, lines 25-35). Specifically, Herbert E. Mayer allows for this design in order to "enable an automatic stabilization of the wafer temperature at a predetermined level" (column 3, lines 35-45).

7. Claims 24 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hagge et al (U.S.Pat. 3,710,251) and Suzuki et al (U.S.Pat. 5,474,877) in view of Kimura (U.S.Pat.5,578,127). Hagge and Suzuki are discussed above. Hagge and Suzuki do not describe an apparatus wherein the substrate support includes an upwardly facing bowl, toward the second surface, for retaining excess fluid that drips from the substrate.

Kimura describes an apparatus wherein the substrate support includes an upwardly facing bowl (29, Figure 2) for retaining excess fluid that drips from the substrate.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made for Hagge and Suzuki to add Kimura's upwardly facing bowl to Hagge's apparatus.

Motivation for Hagge and Suzuki to add Kimura's upwardly facing bowl to Hagge's apparatus is discussed by Kimura (column 5, lines 1-8), and is to "forming a processing space therein..." and thereby catch (delimit) overflow of excess fluid.

8. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hagge et al (U.S.Pat. 3,710,251) in view of Suzuki et al (U.S.Pat. 5,474,877). Hagge and Suzuki are discussed above. Hagge and Suzuki do not show additional temperature sensors in Figure 2.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Hagge and Suzuki to add additional temperature sensors for monitoring at least one temperature of the substrate further wherein the temperature sensor is coupled to the first and second thermal links to maintain the first and second portions of the substrate at approximately the same temperature.

Motivation for Hagge and Suzuki to add additional temperature sensors for monitoring at least one temperature of the substrate further wherein the temperature sensor is coupled to the first and second thermal links to maintain the first and second portions of the substrate at approximately the same temperature is discussed by Hagge et al (column 8, lines 14-23; column 7, lines 63-68). Specifically, Hagge et al describes that such a thermocouple sensor 103 provides for automatic control. Further, it is well established that the duplication of parts is obvious (In re Harza , 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04).

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9. Claims 45-48 are rejected under 35 U.S.C. 103(a) as being anticipated by Hagge et al (U.S.Pat. 3,710,251) in view of Suzuki et al (U.S.Pat. 5,474,877). Hagge is discussed above.

Hagge does not describe a multiplicity of components described above. Namely:

a second support

a second temperature controller

a third thermal link

a fourth thermal link

a second substrate support that is rotatable about a rotation axis

a liquid supply conduit having an opening for dispensing a liquid onto the substrate

Suzuki et al describes a substrate (11) support (12) that is rotatable about a rotation axis (Figure 1,2; column 3, lines 1-5). Suzuki et al describes a liquid supply conduit (30) having an opening for dispensing a liquid onto the substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Hagge to replace his substrate support with Suzuki's substrate support that is rotatable about a rotation axis (Figure 1,2; column 3, lines 1-5) and provide a liquid supply conduit having an opening for dispensing a liquid onto the substrate, and to reproduce components described above by Hagge et al.

Motivation for Hagge to replace his substrate support with Suzuki's substrate support that is rotatable about a rotation axis and to provide a liquid supply conduit having an opening for dispensing a liquid onto the substrate is to develop a resist pattern that is evenly dispersed when coated. Further, it is well established that the duplication of parts is obvious (In re Harza , 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04).

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10. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hagge et al (U.S.Pat. 3,710,251) in view of Suzuki et al (U.S.Pat. 5,474,877). Hagge and Suzuki are discussed above. Hagge and Suzuki do not teach plural orifice.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Hagge and Suzuki to reproduce his first orifice aligned with a first portion of the substrate and make a second orifice aligned with a second portion of the substrate.

Motivation for Hagge and Suzuki to reproduce his first orifice aligned with a first portion of the substrate and make a second orifice aligned with a second portion of the substrate is to provide additional temperature control of the substrate. Further, it is well established that the duplication of parts is obvious (In re Harza , 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04).

Response to Arguments

11. Applicant's arguments filed August 4, 2003 have been fully considered but they are not persuasive.

12. Applicant states that Hagge “does not disclose, or fairly suggest that the top surface 14 may be rotated while the wafer is undergoing a test procedure”. In response, the Examiner agrees that Hagge does not teach a rotating pedestal as outlined in the above rejections:

“Hagge et al does not teach a substrate support that is rotatable about a rotation axis.”

For this reason, Suzuki et al (U.S.Pat. 5,474,877) was introduced for teaching:

“

Suzuki et al describes a substrate (11) support (12) that is rotatable about a rotation axis (Figure 1,2; column 3, lines 1-5) that extends through the substrate and perpendicular to the first and second surfaces of the substrate.

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“

13. Applicant states that in Hagge's Figure 1 that “test pins 19 extend from the support 35 to the wafer 11”. There is no suggestion or teaching in Hagge's Figure 1 of such a structural relationship.

14. Applicant states that Hagge's apparatus cannot be modified by the Suzuki teachings because the Hagge apparatus must “maintain electrical contact between test points on the wafer and test probes”. However, Hagge teaches that such contact depends where in the process the wafer is:

“

Then at each of these positions the X-Y table structure 28 raises the pedestal assembly 10 to bring the wafer 11 into contact with stationary test probe wires 29 and 30.

“ (column 4, lines 58-62).

As a result, Hagge's apparatus would remain operable in view of Suzuki reference.

15. The remainder of Applicant's arguments are directed to the amendments to the claims. In response, Applicant is directed to the body of the claim rejections above.

Conclusion

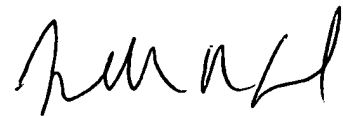
16. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.



JEFFRIE R. LUND
PRIMARY EXAMINER